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DEPARTMENT OF SOCIAL ECONOMY
FOR THE
UNITED STATES COMMISSION TO THE PARIS EXPOSITION OF 1900

MONOGRAPHS
ON
AMERICAN SOCIAL ECONOMICS

EDITOR
HERBERT B. ADAMS
Professor of American History in Johns Hopkins University

ASSOCIATE EDITOR
RICHARD WATERMAN JR

VIII

INSPECTION OF MINES

BY
WILLIAM FRANKLIN WILLOUGHBY
Expert in the Department of Labor, Washington, D. C.

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DEPARTMENT OF SOCIAL ECONOMY
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MINE LABOR AS REGULATED BY LAW IN THE UNITED STATES

By WILLIAM FRANKLIN WILLOUGHBY

The conditions under which mining operations must be conducted are so peculiar and offer such peculiar dangers that most nations have found it desirable to enact special laws regulating the manner in which this industry must be prosecuted. The present article is an attempt to show in a rapid sketch how this obligation has been interpreted by the different commonwealths of the United States. In other words, it is desired to show to what extent the mining of coal in the United States is considered an industry requiring special regulation, and what is the character of this regulation as it exists at the present time.

Coal is mined in considerable quantities in only a portion of the United States. We therefore find that of the 45 states and three organized territories 18, or slightly over one third, do not possess any laws relating specially to coal mining. In most, if not all of these, there is little or no mining done. Disregarding these there remain 30 states, namely, Alabama, Arkansas, California, Colorado, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Maryland, Michigan, Minnesota, Missouri, Montana, Nevada, New Jersey, New Mexico, New York, North Dakota, North Carolina, Ohio, Pennsylvania, South Dakota, Tennessee, Utah, Washington, West Virginia and Wyoming that have enacted more or less detailed laws concerning mining. A study of the extent to which coal mining is subjected to special legal regulation therefore involves only the consideration of the legislation of these 30 states.

An examination of these various laws shows that a very general agreement has been reached by the different legislatures in regard to the character of the regulations that should be provided. The laws of all are strikingly similar. The

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same provisions and even the same phraseology are found repeated in the statutes of state after state. The differences that exist are mainly in the extent to which regulation is attempted and the efficiency of the system that is provided for its enforcement. It is quite feasible, therefore, to study the legislation of the states as a whole.

If these mining laws be examined analytically it will be seen that their purposes can be grouped in six distinct classes: 1) the regulation of the employment of women and children; 2) the formulation of a set of rules and regulations setting forth more or less specifically the manner in which the operation of mining must be conducted; 3) the insuring that competent men will be employed to fill responsible positions, which is largely done through a system of state examination and the granting of certificates of competency; 4) the requirement that all fatal or serious accidents be reported and investigated; 5) the protection of the rights of miners through regulating the manner of weighing or measuring the quantity of coal mined and the frequency and character of wage payments; and 6) the provision of an inspection service for the purpose of insuring that the laws relating to mining are duly enforced. By taking up each of these points in turn we shall be able to obtain a clearer idea of the extent to which these various objects have been provided for by the different states.

First, in regard to the extent to which the employment of women and children has been specifically prohibited:

Of the 30 states to which we have accredited mining laws ten, Alabama, Arkansas, Colorado, Illinois, Indiana, Missouri, Pennsylvania, Washington, West Virginia and Wyoming absolutely forbid the employment of women either in or about mines (clerical work in offices sometimes excepted). As regards the employment of children, however, 20 prohibit the employment of both sexes under a certain minimum age. The five states, Alabama, Iowa, North Carolina, Tennessee and West Virginia have the least rigid exclusion, their laws providing that children under 12 years of age, and in addition

those children under 14 in Missouri, those under 15 in New Jersey and those under 16 in the other states shall not be employed unless they are able to read and write. Ten states, Arkansas, Idaho, Illinois, Minnesota, Indiana, Montana, Pennsylvania, South Dakota, Washington and Wyoming have fixed the minimum employment age at 14, and Arkansas has in addition required boys under 16 to be able to read and write as a condition precedent to employment. Ohio prohibits the employment of children under 15 years of age in mines. The United States statutes on this subject simply provide that children under 16 years of age can not be employed in any mine in the territories. These prohibitions apply to work above as well as under ground, with the exception of Pennsylvania where the employment of children under 14 years of age in mines is prohibited, but boys between the ages of 12 and 14 years are allowed to work about mines.

It is interesting to note that but four states have attempted to regulate the hours of labor of adults in this industry. Utah and Wyoming have declared eight hours to constitute the maximum length of the working day that can be required of any miner, unless extra efforts are required to save property or life; and Montana in 1897 imposed a similar limitation on the hours of labor of hoisting engineers in mines. Ohio passed a somewhat similar law limiting the hours of labor of railway and mine employees to ten a day. These restrictions, it should be understood, do not prevent mine owners from operating their mines any number of hours, by using different shifts of men.

The constitutionality of these laws has been repeatedly contested on the ground that they interfered with the liberty of contract and the property rights of employers as guaranteed by the constitution. The Ohio law was declared unconstitutional. On the other hand, the supreme court of the United States, in a notable decision in 1898, sustained the Utah law. This would seem to establish definitely the power of the states to pass laws limiting the hours of labor of mine employees.

Much the greater portion of the mining laws is devoted to setting forth in greater or less detail the various regulations which must be observed in the working of mines. The development of these has been in almost all cases one of gradual evolution. The earlier laws simply provided that proper precautions should be taken to secure the safety of miners. From year to year additional legislation was enacted, specifying particular conditions that must be observed. In time these provisions were gathered together and reenacted as a single law, thus constituting what might be called a mining code.

It is manifestly impracticable to attempt here to describe the exact character of the legislation in each state individually. Fortunately, even the desirability of doing this does not exist. The same provisions are found reproduced with but little change in the laws of almost all the states, the only difference being in the extent to which the formulation of mining regulations has been carried. The following recapitulation of the essential provisions of this legislation gives all of the material points covered by any of the mining laws. Some of the states, notably Pennsylvania, cover practically all of the points here enumerated in their laws, while others merely include the most important.

The mining code of an American state in its most developed form therefore provides: 1) that every owner, operator or superintendent of a mine employing over a certain number of persons, usually ten, shall cause to be prepared an accurate map or plan of such mine on a scale of 100 or 200 feet to the inch showing all the workings of the mine; that this map shall be revised at least once in six months in order to show new workings; that when a mine is abandoned a final accurate map must be made of it, and that copies of these maps must be furnished to the mine inspector and other copies be kept where they can be readily inspected at the mines; 2) that in mines where 20 or sometimes ten persons are employed there must be at least two escapement openings to the surface from

each seam, separated from each other by natural strata of a certain thickness, 100 or 150 feet; 3) that mines must be so ventilated by artificial means that there will be furnished a minimum of 100 cubic feet of air a minute for each person employed; 4) that doors used to direct or control ventilation be so hung that they will close automatically and that doorkeepers be provided for the more important passages; 5) that an adequate supply of timber for props be constantly available; 6) that suitable means be provided for raising or lowering workingmen in mines, and to secure this that the cage used for this purpose have a top or bonnet of metal to protect the passengers from articles or rocks; that no single cable be used; that the cage be equipped with a safety catch; and that the cable drum be provided with flanges and a brake; 7) that all passage-ways through which cars pass have shelter holes in the sides not less than 15 or 30 feet apart into which workingmen may retreat to avoid passing cars; 8) that the mines be kept well drained; 9) that there be a metal speaking-tube or other means of vocal communication between the bottom and top of all shafts; 10) that a certain code of signals, usually as specified in the act, be employed to regulate the movement of the cages up and down the shafts; 11) that only authorized persons be allowed to ride on loaded cars and cages; 12) that no coal be hoisted while men are ascending or descending the shafts; 13) that all machinery be properly guarded; 14) that abandoned passages be closed; 15) that shaft openings be fenced; 16) that steam boilers be inspected at certain intervals; 17) that only a certain quality of vegetable or animal oil be used for lighting; 18) that precautions be taken to prevent injury from falling coal or rock; 19) that blasting operations be properly regulated; 20) that copies of mining rules be conspicuously posted. For mines generating fire-damp special precautions must be taken, as 21) that they be examined every morning with a safety lamp before miners go to work; 22) that all safety lamps be owned by mine owners; 23) that bore holes of a certain depth be kept in

advance of the workings of all passages when approaching workings.

The above are the usual provisions of a mining code. In a few cases conditions are given which are not included in this list. Thus Pennsylvania requires all stables in mines to be built in the solid strata without the use of wood; Pennsylvania and Montana, that stretchers be provided for removing injured workmen; and Kansas, that all blasts be fired by special firers.

Rules, however, can never replace the personal element. The best of rules are of but little avail unless competent men can be secured to supervise their application. The most significant and important feature of the whole system of mine regulation, therefore, is that by which a number of states have sought through a system of examinations to insure that those in charge of the actual operations of mining shall be competent men. The positions thus specially provided for are those of mine foreman or boss, fire boss, and occasionally that of hoisting engineer.

The majority of the mining states, including California, Colorado, Kansas, Maryland, New Mexico, Tennessee and West Virginia, simply provide that the underground operations of mines shall be in charge of a competent superintendent or mining boss, whose special duties are to see that a proper amount of ventilation is provided, that the walls and roof are properly timbered, etc., and that in the case of all mines generating fire-damp there shall be employed a "fire boss," with the duty of examining all working-places for gas every morning before the miners go to work.

The more important mining states, however, have gone much further. They have treated the positions of "mine boss" and "fire boss" as of such responsibility that no one is allowed to fill them till it is duly certified by the state that he possesses the required competency and experience. These positions have thus been put into the category of licensed occupations, such as piloting and plumbing. States have thus

required on the one hand that every mine be under the supervision of such officers, and on the other that these officers be in possession of certificates of competency granted after satisfactory examination.

The Pennsylvania law, for example, provides that on the petition of any mine inspector the court of common pleas in any county in the district shall appoint a board of examiners to consist of a mine inspector, a miner who has received a certificate of competency, and an operator or superintendent, whose duty it is to examine all applicants for the position of mine or fire boss. To secure a certificate of competency it is necessary for an applicant 1) to be at least 23 years of age; 2) to have had five years' experience as a miner in bituminous coal mines of the state after he had attained the age of 15 years; 3) to be a citizen of the state; 4) to be of good moral character; and 5) to pass an examination as to his knowledge of mining. Certificates of two grades are granted, that of the first grade to those who have had the experience which qualified them to serve in mines producing gas; and that of the second grade to those who have not had this experience and therefore can not be employed in such mines. In order to protect those serving as mine or fire bosses when the act was passed, it was provided that "certificates of service" should be granted to those who had been employed with the same company during the year preceding, with the proviso, however, that before they could take service with another company they should obtain a certificate of competency.

Illinois, Indiana, Alabama, Montana and Wyoming have followed the lead of Pennsylvania and have enacted almost identical provisions, the first two requiring in addition that all hoisting engineers must also be provided with certificates of competency.

As the prevention of accidents constitutes the most important purpose of mine regulation, it is evidently very desirable that accurate information should be obtained concerning the

frequency and causes of accidents, in order to determine the responsibility for such occurrences, and whether any progress in their prevention is being made. Every one of the 20 states possessing factory codes, with possibly one or two exceptions, requires that the mine owner or superintendent shall report to the inspector of mines every accident resulting in death or serious injury to an employee. It is further provided that in case of fatal accidents the coroner shall be notified and an inquiry held to determine the person at fault for its occurrence. The mine inspectors are also required to embody in their regular reports statements of all accidents occurring during the year. The information thus afforded is of great value, but unfortunately in no case does it approach anything like desirable detail. The term "serious injury" which occurs in all the acts is altogether too vague and uncertain. In order to be of the maximum value the report of each accident should show the cause of such accident, the extent of the injury caused, whether resulting in death, total or partial incapacity for labor, or temporary disability, the length of time so disabled, the age of the person injured, and whether the accident was due to the fault of the person injured, to another, or to an unavoidable cause. Whatever the information obtained, however, it is to be regretted that greater uniformity does not exist between the practice of reporting accidents in the different states. Improvement in the collection of statistics of accidents to miners is largely dependent on the mine inspectors of the different states adopting the same form of report for accidents.

We now turn to what may be called the keystone to the whole system of state regulation of mines—viz: the appointment of state officers or mine inspectors with the duty of personally supervising or controlling certain features in mining and seeing that the conditions required by the state are complied with. It has been the universal experience that labor legislation is of little utility unless some system of good government supervision is at the same time provided. In a

way, therefore, the measure of the efficiency of mine regulation is that of the efficiency of mine inspection.

Most of the mining states have recognized the necessity for government supervision, and 27 states have made some provision for the inspection of mines. The majority of these, viz : Arkansas, Idaho, Kansas, Kentucky, Maryland, Michigan, Missouri, Utah, Washington and Wyoming, have provided for only one inspector. In North Carolina and Tennessee, the commissioner of labor is the inspector. In New Jersey and New York, where there are no coal mines, the offices of inspector of factories and mines are combined. Maine, which also has no coal mines, has an inspector of factories, workshops and mines, but his duties seem to be of a purely statistical character. The United States statute provides that an inspector of mines shall be appointed by the president for each territory producing 1000 tons of coal yearly. Colorado, Indiana, Montana and West Virginia each has two inspectors; Alabama and Iowa each has three inspectors; Washington has a state geologist who acts as mine inspector, and has two assistant inspectors; Illinois has seven inspectors; Ohio has one chief inspector and seven district inspectors; and Pennsylvania has one inspector for each district containing not less than 60 nor more than 80 mines.

The duties of inspectors are generally stated to be to inspect all mines with specified frequency, yearly, semi-annually or quarterly, and to see that all the requirements of the law relating to mining are strictly complied with. In addition to these general duties, however, it is usual to specify that they shall keep an exact record of all inspections, and that they shall report annually or biennially, showing particularly the condition of the mining industry and the number of accidents. These reports therefore serve the double purpose of showing the results accomplished by inspection, and giving general statistics and other information concerning mines.

For the enforcement of mining laws, with their technical provisions, it is evident not only that a considerable technical

knowledge is required of the inspectors, but that no small degree of discretion must be left to them in the enforcement of the obligations which they impose. It is highly desirable, therefore, that competent and specially trained men should be secured for these positions. As the most certain way of accomplishing this, the practice is now becoming general for these officers to be selected only on satisfying certain requirements and passing a wholly or partly competitive examination.

The Pennsylvania system, therefore, provides for a board of examiners to be composed of two mining engineers and three other persons who have passed examinations as mine inspectors or mine foremen, to examine candidates for the position of inspector of mines. The examination must be in writing, with an oral examination concerning explosive gases and safety lamps. Candidates must be citizens of the state, of temperate habits, 30 years of age or over, with at least five years' experience in bituminous coal mining in the state, and an experience in mines generating fire-damp. The names of successful candidates are certified to the governor, who makes the appointments.

Illinois has a board of examiners composed of two practical miners, two coal operators and one mining engineer appointed by the bureau of labor statistics. The qualifications required of inspectors are about the same as in Pennsylvania. In Indiana the inspector is appointed by the state geologist after an examination, and an assistant inspector is appointed by the latter, also after an examination. Both must have had an experience of at least ten years in practical mining. In California the examining board is appointed by certain judges, and the inspectors must be 30 years of age and have had five years' mining experience. In Washington the board consists of three practical coal miners, three coal operators and a mining engineer, and the inspector must have two years' experience. Iowa has a board composed of two miners, two operators and a mining engineer, and the inspector must be 25 years of age with five years' experience. The other states

which do not possess mining boards usually specify that inspectors must be of a certain age, possess both a theoretic and practical knowledge of mining, and have had an experience in practical mine work for a certain number of years. In all cases it is provided that inspectors must not be financially interested in any mine in the state.

The last class of mining laws are in their nature quite distinct from those we have been considering. They have for their object the regulation of the relations between mine operators and their employees. The economic dependence of the miners has undoubtedly in some cases been taken advantage of in the past, and the miners defrauded or at least unjustly treated in a number of ways. The two greatest grievances of the miners have been that the employers have not given them credit for all the coal mined by them and that they have been compelled to trade at stores owned and conducted by the mine owners.

In itself the establishment by the companies of stores to supply the wants of their employees possesses nothing detrimental to the rights or liberties of the workingmen. On the other hand there is no reason why they should not serve a useful purpose. Unfortunately there can be little doubt that in many instances these stores have been used by companies as means of oppression. Miners were compelled to trade at the store conducted by their employers, and to insure their doing so they were frequently paid in scrip orders on the store instead of in money. A system of credit was at the same time practised which kept the workingman constantly in debt to the company, and as the wages were withheld to meet this indebtedness, employees would frequently go for long periods without receiving any money that they could dispose of as they saw fit. There was no check on the prices that could be charged for commodities. Any increase in wages could thus be made a fiction.

For a long time this "truck system" as it was called constituted one of the greatest sources of friction that existed

between the mine owners and their employees. The miners themselves did not possess sufficiently strong organizations to offer a successful resistance. Great pressure was therefore brought to bear on the legislatures of all the mining states to prohibit by law the system of company stores, and most of the states passed laws to this effect. This prohibition has taken two forms, either directly forbidding mining companies to own or control stores, or more often requiring that all wages shall be paid in money, or if paid in scrip that this scrip shall be redeemable on demand in money. At the same time the payment of wages as often as once every two weeks was made obligatory.

The constitutionality of these laws has been attacked in a great many instances, and many of them have been declared unconstitutional. In Pennsylvania, Illinois, Missouri and Tennessee they were declared void because they violated the liberty of contract guaranteed by the constitution. In Tennessee the curious ground was taken that such a law indirectly provided for imprisonment for debt, which was prohibited by the constitution. In Indiana, however, the law was upheld and New York avoided any constitutional objections by limiting the scope of the law to corporations. In spite of the fact that laws regulating the payment of wages have been declared void in so many states, the results desired have in great part been accomplished. This has been due, on the one hand, to the arousing of public opinion on the subject, and on the other, to the fact that employers are beginning to recognize more fully their obligations toward their employees.

As regards the second complaint, concerning the manner of determining the amount of coal mined by each miner, practically all of the 20 states under consideration have enacted laws the purpose of which is to insure that the coal is honestly weighed. There is little difference between the legislation of the several states. The typical method of regulation is to prescribe that at all mines there shall be provided suitable and accurate scales for weighing coal; that these scales should be

inspected periodically by mine inspectors or the miners themselves ; that the weighman must take oath to honestly perform his duties and keep an accurate record of the amount of coal weighed ; that these records shall be open to inspection and finally, as an additional precaution, that the miners shall have the right to employ a " check-weighman " who shall be permitted by the company to superintend the weighing of all coal, and thus control the work of the company's employee. In case such a check-weighman is employed he must also be sworn and must keep an accurate record of the coal weighed. Some states, as Maryland, Pennsylvania and West Virginia, also require that all cars be numbered, and their weight and capacity plainly marked on each one.

A few states, notably Illinois, Indiana, Iowa, Kansas, Missouri and Washington have exercised a more direct intervention and made it compulsory on all mine operators to weigh coal before it is screened. This law has been resisted by the mine operators, and in Illinois at least has been declared unconstitutional, because it is special legislation and deprives persons of the liberty of making their own contracts.

We have now passed in review the various ways in which the operations of mining have been subjected to special regulation by the states. Experience has amply demonstrated that this interference on the part of the government, and the formulation of regulations setting forth in detail the various precautions that must be taken, have been absolutely necessary for the protection of miners against accidents. The present degree of regulation has been the result of a gradual growth, and the goal has as yet been by no means reached. Pennsylvania, Illinois, Ohio, West Virginia and several other important coal mining states are now in possession of quite complete mining codes, but the majority of states have far from reached this standard. The latter have, however, the complete legislation of the former states as models, and not a year passes without additions and improvements to the mining laws of some of them.

To one looking over the whole field it seems that the most important step that can be taken is to extend the system already practised by a number of states insuring thorough examination, and to grant certificates to men competent to fill responsible positions. James Bryce, with his accustomed perspicuity has said that good men can make any political system work tolerably, but that no system however perfect will give satisfactory results unless in the hands of honest and capable persons. What is true of political machinery is equally true of industrial organization. Certainly it is desirable to have a good code of mining regulations, but it is more important still that capable men be secured to direct their application.

